ABSTRACT

"To study the role of diffusion weighted MRI in predicting response to concurrent chemoradiotherapy or radical radiotherapy in locally advanced laryngeal and hypopharyngeal malignancy as part of the organ preservation protocol."

Introduction: According to the Globocan fact sheet, worldwide there are approximately 1,30,000 new laryngeal cases and a reported of 70,000 deaths annually. Hypopharyngeal cases are less common with approximately one-fourth of as many cases. According to the Indian data there are about 20000 cases being reported for laryngeal malignancy and about 37,000 cases of hypopharyngeal malignancy. Laryngeal and hypopharyngeal malignanacy were Traditionally treated with surgery which severely affected the quality of life of patients (impaired swallowing and eating and speech deficit) as well as social losses due to cosmetic deformity from surgery. Organ-preserving approach with concurrent chemoradiotherapy or radical radiotherapy followed by salvage surgery in case of residual or relapse, has now been accepted as a standard management for locally advanced laryngeal and hypopharyngeal malignancy. However, not all patients respond to the treatment & end up undergoing surgery. However if the outcome can be predicted before or at an early stage of treatment using imaging biomarkers like diffusion weighted MRI(dWMRI). The treatment outcome may be improved by using an optimized treatment strategy tailored for individual patient.

Objective: To study the role of diffusion weighted MRI derived parameters like ADC as an imaging biomarker to predict response to concurrent chemoradiotherapy or radical radiotherapy in locally advanced squamous cell carcinoma larynx and hypopharynx. The secondary outcome was to validate the role of diffusion weighted MRI to detect, characterize and monitor the response to chemoradiotherapy or radical radiotherapy.

Methodology: Our study group consisted of 19 patients with male predilection and predominantly T3 stage treated with organ preservation intent with concurrent chemoradiotherapy or radical radiotherapy were assessed for treatment response with dWMRI

at baseline, first week, fourth week and at follow up. The ADC values were compared at different timepoints and correlated with treatment response.

Results: The potential of using dWMRI in predicting early treatment response in patients with locally advanced laryngeal and hypopharyngeal malignancy being treated with organ preservation approach. The pretreatment ADC values were correlated with treatment response. Based on the results of this study pretereatment ADC could predict treatment response with a sensitivity of 80% and specificity of 62%. It was observed that an abrupt rise from the pretreatment ADC to the first week ADC was characteristic of complete response while a gradual rise of ADC over the different points suggested a partial treatment response. We were also able to correlate between ADC values at different time points and also between pretreatment ADC and pretreatment size. However these observations have to be validated over larger study population to derive meaningful outcome.

Conclusion: It was feasible to use dWMRI as an imaging biomarker to predict treatment response. The dWMRI with the ADC values allowed early response prediction which correlated with tumour response. The rate of increase in the ADC value is independent of the pretreatment ADC and is more important to predict response.The slow rise or no change in the ADC values may predict partial or no response. Thus early treatment response prediction would help in offering individualised treatment to our patient population by administering early surgical interventions in case of non responders or offer dose escalation / boost radiotherapy in case of partial treatment response.